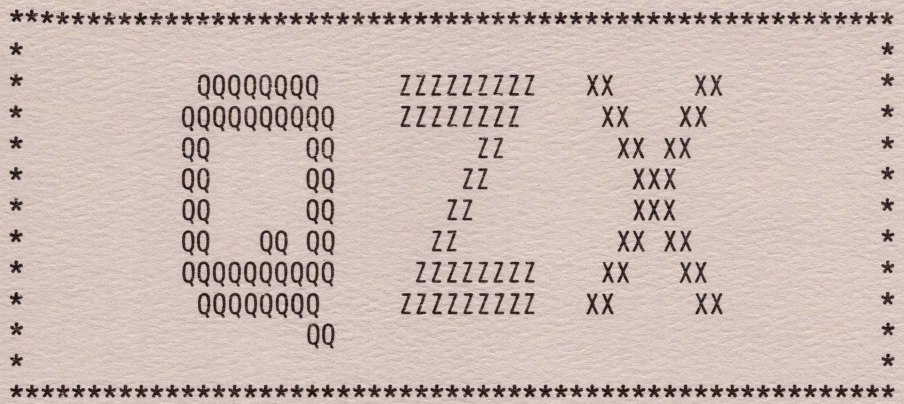
QQQQQQQQ ZZZZZZZZZ XX XX
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QQ

The Journal Covering Amateur Radio & Sinclair Computers
ZX-80; Micro-Ace; ZX81; T/S 1000, 1500, & 2068; QL
2025 O'Donnell Drive
Las Cruces, New Mexico
88001

K5XY
Alex. F. Burr
Publisher

W4GHV
Bo Barry
Editor

Volume 5 Number 1 ($1.50-issue) December 1986

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Coming Up As We Start Our FIFTH Year!

Info on the T/S Guide of Telecommunications
Class A Transistor Design, 73 Mag article adapted by WA6DLI
Path Loss Calculation Program
Precision Frequency Generator Program (1000/1500), from CTM by D. Nordquest
TI Keyboard for the T/S 1000, from CTM by P. Patterson
Broadcast Bandscan Program, from CTM by J. Smith

LAST CALL FOR QL KIT

Last call for a special buy on a Sinclair QL computer. Here is your chance to get a 68000 type computer for only $130, including shipping to the continental US, with two tape drives, SUPERBASIC, and the multitasking QL operating system.

These kits come with a completely assembled main circuit board and all the other pieces to enable you to assemble a complete QL. Neither Bo nor I have actually assembled one, but WA6DLI has and he is completely satisfied.

Carol Whitham of A+ Computing said that it takes about one hour to put the pieces together and that no soldering is required. The power regulator and its associated heat sink, for instance, plugs into a socket with no soldering needed.

For more information on the QL see the reviews in back issues and the ads in this and other issues.

If you want one, send QZX a check for $130 within FOUR days of receiving THIS issue of QZX. The check will not be cashed until the unit has been shipped to you.

MINIATURE SINCLAIR MONITOR
K5XY

The Sinclair (Timex) computers, especially the ZX81, T/S 1000, and T/S 1500, are small and light in addition to being inexpensive. This small size makes them ideal for portable use. However to see what you are doing, a TV monitor is required. Because TV's are available almost everywhere, many people just hook up to the nearest set. WA6OJJ, for instance, operates packet with his T/S 1000 by hooking up to the TV set in his motel room where ever he is staying that night.

But for real portable use, I have always wondered what one of the new miniature TV sets might do. Sinclair, as might be expected, has produced one of the smallest and least expensive of those sets, but would it work with his computers? Recent price reductions have made it possible for me to try one out.

It is indeed small. It measures less than 1 1/4" x 3 1/2" x 5 1/2" and will fit in a coat or pants pocket easily if you do not mind a bit of a bulge. There is even a nicely fitting case into which it slides. The color is Sinclair black, with a rather ghastly high visibility orange used for control legends and tuning scale.

The antenna is a standard telescoping black whip which expands from 5" to 18". The whip is attached to the set with a substantial bracket and is easy to manipulate. When the antenna is collapsed and folded, there is a clip which holds the far end securely to the case.

The most distinctive feature of the set is the battery. The battery used is a flat six volt compact power source made by Polaroid. It is the same general type as used in their cameras. The battery is 3" wide, 3 5/8" long, and about 1/8" thick. It slides into a slot in the back of the set and is easily changed without opening anything.

I have not used the set enough to get a good feeling for battery life, but power could be expensive. A+ Computer Response sells them at three for $10.00. Less long lasting batteries are sold elsewhere presumably for less money. Those less powerful ones last for about two hours of continuous use. There is provision for an external DC supply. The instructions which come with the set caution one to use only a Sinclair power supply, but I can not see why any six volt DC power supply equipped with a small coaxial type plug of proper polarity would not work.

The first thing I did when it arrived was to try it out as a TV set. Las Cruces is not a TV center (the nearest large town with network TV is El Paso 50 miles to the south), but I did expect to get a weak signal from the local PBS station located fifteen miles west and a signal from a new UHF station that was dropped into Las Cruces about a year age. I was surprised and pleased to be able to get good pictures from four stations including one from Mexico. I certainly cannot complain about the sensitivity.

The signal strength was strongly dependent on the position of the antenna. The strength varied dramatically when the antenna was moved a few inches. The length of the antenna had relatively little effect on the received signal. The set is stable. The automatic frequency circuits work well because when a station is tuned in, it stays tuned in. The VHF TV band is divided into two parts. The UHF region is a third band. Moving the tuning knob drives a pointer across a one inch scale. It takes about 20 turns of the tuning knob to do this. Nevertheless tuning is a bit touchy. One has to tune past a station to let the automatic frequency control circuits capture the station and then back off to just before sync is lost in order to tune in the audio.

The audio is certainly not high fi. Of course, not much fidelity can be expected

from the less than one inch speaker. There is an external speaker jack which allows private listening and does improve the quality a bit. The volume available is enough for one person close to the set,which is all that is necessary.

The big question is how well does the TV set act as a monitor. The first problem is to couple the set to the computer. There is no external antenna input so one must couple the computer output to the TV antenna.

Trial and lots of errors produced the following arrangement which proved to be adequate but has not yet been optimized. My connecting cable used RCA type plugs so I took an ordinary RCA jack and attached two 13" wires to it. One wire was taped along the antenna which came with the set and the other (the wire connected to the cable shield) was wrapped tightly around the top of the set. This arrangement produced an acceptable picture, easily tuned in. The picture was just a very little bit better when the set antenna was fully extended than when it was fully collapsed.

The picture was clear and the resolution was at least as good as an ordinary TV set. The letters were all clearly readable. Just a little difficulty was had with some of the inverse characters. The lines were all well located on the screen. The top line showed no tendency to run under the top mask as in some TV sets. The bottom line was well above the bottom of the TV screen and the side margins were ample.

There was on my set just a barely noticeable loss of resolution at the beginning of the lines. The resolution at the edges and corners was otherwise as good as the resolution in the center of the picture, somewhat to my surprise. If the antenna becomes a bit uncoupled, the picture started to degrade. The first quality which went was the sharp edges around the letters. With decreasing signal the picture got snowy, and then the frequency lock broke and the picture was lost.

My eyes are showing the effects of a lifetime of reading and writing. I use bifocals which should be updated. To clearly see the TV screen, I had to remove my glasses and place my eyes 7 1/2 + or - 1/2 inches from the screen. At this distance (similar to the distance I must use when soldering on a small PC board) I could focus easily on the letters on the screen. My eyes did not quickly tire and there was no strain from focusing. It was a bit inconvenient to have to keep my head so precisely placed. Those with younger eyes will have less trouble. With my glasses I could correctly focus with my head farther away, but then the letters were too small to read.

Overall I was very pleased to find this means of getting a truly small and portable read-out device for our computers, and there is still lots of room for our readers to develop more efficient ways to connect those computers to this read-out device.

A Better RGB Circuit for the 2068 & QL
Reprinted from SUM, by Joe Williamson

A circuit in an earlier issue of SUM (Feb 86) was designed around the Sears RGB/TV/Monitor (same as Sanyo model # 31C426) and the Magnavox (NAP) RGB-40 or 80.

These monitors (and the QL monitor as well) take negative-going composite sync and active high RGB signals and have well buffered inputs to clean up any poor inputs.

Many RGB monitors out on the market don't have these features and therefore do not work very well or at all with the circuit described earlier. With the simple addition of a 74LS86 quad 2-input exclusive OR gate, you can shape (buffer) and invert all four signals to whatever format you need by changing the polarity of one of the two input lines on each of the four gates. The 2N2222 transistor is not critical, most any NPN will do.

The improved circuit can be found elsewhere in this issue.

VHF/UHF Ray Trace Program, W6GZN QST
Program, adapted for the 2068 by Bob Howard, WA6DLI

Tucked somewhere in this issue is a screen output of this interesting program. The plot is for milliradians of +4,-4,-9,-5,+5,6,7,& 8 at a 1700 feet antenna height and corresponds to Fig 4 in the QST article. (Replace the British pound sign with #).

The program appears elsewhere in this issue, with the exception of lines 520, 530 & 600 which are reprinted below.

```
520 CLS:PRINT "This program is from QST Nov '86 page 18 and this article should be read for full understanding of what you are seeing."'"Enter angle in + or -0 to 12 mr. Enter antenna height in feet. If plot goes off screen and you get OUT OF RANGE report, enter GOTO 290!"
530 PRINT '"The profile for refraction is"'"Curve B, held in DATA. Plot is"'" limited as original was for a plotter!"'" This translation is by WA6DLI!"
600 PAUSE 4e4:CLS:RETURN
```

QZX FRIENDS

W6JPB -- Joe says he is about three or four months away from getting on packet and that he is enjoying his QL greatly.

WA6OJJ -- Bob flew into El Paso with his portable packet set and promptly contacted QZX on the local PBBS. His station consists of an HT, a MFJ TNC, and a T/S 1000 with a Comlink I adapter. The rig has an external keyboard. He hooks the whole thing up to a hotel room TV. He really did fly in too. He pilots a King Air 200 for General Dynamics. He is putting the equipment into a case so he can have an airborne digipeater.

W*6AST -- Kenneth is getting ready to go back to England with his T/S 2068 and a collection of ham software. He sent a list of seven ham programs obtainable from GW3RRI, FRON, Upper Llandwrog, Caernarfon, Geynedd, LL54 7RF, Wales, United Kingdom.

K1US -- Jon is headed the other way as he returns to the US from Austria. He uses his Sinclair machines just for RTTY.

W8FXZ -- Dick is working on a program to use an Atari CX 85 number pad on the T/S 2068.

VE3LNQ -- Vic has a QL on packet using the set up previously described in QZX. He is looking for ways to get hard copy from his screen.

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: T/S 1016 16K RAM MODULES. 1 FOR $15, 2 TO 15 - $7.50 EA., 16 OR MORE - $5 EA. PPD. SEND CHECK OR MO TO RALPH ROGNSTAD, 2606 CELANESE RD, ROCK HILL, SC 29730

FOR SALE: QL kits. See article Oct. issue and ad in Nov. issue. Send $130 to QZX, Alex. F. Burr, K5XY, 2025 O'Donnell, Las Cruces, NM 88001.

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```
  5 BORDER 1: PAPER 7: INK 0: CLS
 10 REM DEF FN x()=(x0/100)*10
 15 REM DEF FN y()=(y0/100)*10
 20 DIM n(110)
 22 GO SUB 500
 25 PRINT AT 0,0;"W6GZN VHF/UHF RAYTRACE  X    Y"
 26 PLOT 18,20: DRAW 0,145: PLOT 18,20: DRAW 180,0
 27 FOR j=0 TO 165 STEP 50: PLOT 18+j,20: DRAW 0,-5: NEXT j
 28 FOR j=0 TO 150 STEP 18: PLOT 18,20+j: DRAW -5,0: NEXT j
 29 PRINT AT 20,2;"0    50    100    150 miles": PRINT AT 1,0;"8";AT 3,0;"7";AT
 5,0;"6";AT 8,0;"5";AT 10,0;"4";AT 12,0;"3";AT 15,0;"2";AT 17,0;"1";AT 3,3;"A";A
T 4,3;"N";AT 5,3;"T";AT 4,5;"K feet"
 30 GO TO 255
 40 LET ns=n(h+1)-n(h)
 50 LET ns=ns*10
 60 RETURN
 70 LET sum0=0: LET sum1=0: LET sum2=0
 80 FOR i=1 TO 750
 90 LET h=INT (hsl*.01)
100 GO SUB 40
110 IF hsl<100 THEN GO TO 120:
115 GO TO 140
120 LET ta0=-sum0-ta0
130 LET sum0=0: LET sum1=0: LET sum2=0: LET h0=hsl
140 LET sum0=sum0+1.056e-06*ns+.0000505
150 LET sum1=sum1+1056*sum0
160 LET sum2=sum2+1056*ta0
170 LET hsl=h0+sum1+sum2
180 LET x0=200+hsl/5
190 LET y0=1700-2*i
200 LET off=((h0/100)-19)*10
205 PLOT INK ((ABS a0+1+(A0>6)*-6));(y0/10-h0/10)+off,(x0/10)-5
210 PRINT AT 2,20;"MA ";INT x0;" ";y0
220 REM PRINT AT 3,21;"DA ";INT x0;" ";y0
230 NEXT i
250 GO TO 350
260 FOR i=1 TO 110
270 READ n(i)
280 NEXT i
290 INPUT £1;"Angle in milliradians ";a0
300 INPUT £1;"Start height in feet ";h0
310 LET a0=a0*.001
320 LET ta0=TAN a0
330 LET hsl=h0
340 GO TO 70
350 INPUT £1;"""ENTER"" TO CONTINE "
355 LET z$=INKEY$
360 GO TO 285
370 DATA 183,182,181,180,179,178,177,176,174,172,173,171,170,168,166
380 DATA 165,164,163,162,160,146,129,128,127,128,132,130,129,124,123
390 DATA 120,118,117,117,115,114,112,111,110,111,109,107,107,108,105
400 DATA 102,101,101,102,101,100,100,92,88,84,82,80,80,83,83,83,84,80
410 DATA 79,80,78,76,73,68,68,71,70,69,65,62,61,59,56,56,55,55,53,53
420 DATA 52,53,53,52,50,50,49,51,49,48,47,46,45,44,43,42,42,41,41,39
430 DATA 38,37,36,37,38,37,36,35
440 STOP
500 PRINT "WANT INSTRUCTIONS? Y/N"
510 INPUT Q$
512 IF Q$="" THEN GO TO 510
515 IF Q$="N" OR Q$="n" THEN RETURN
```

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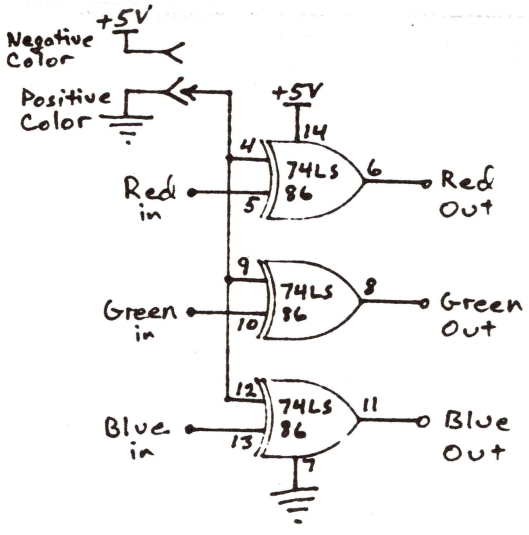
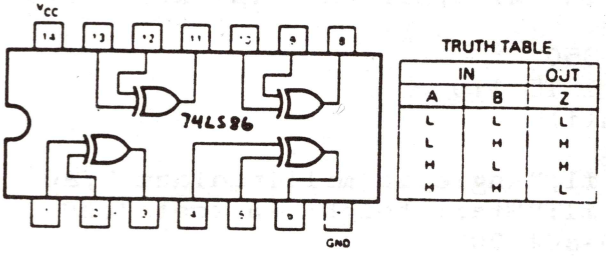
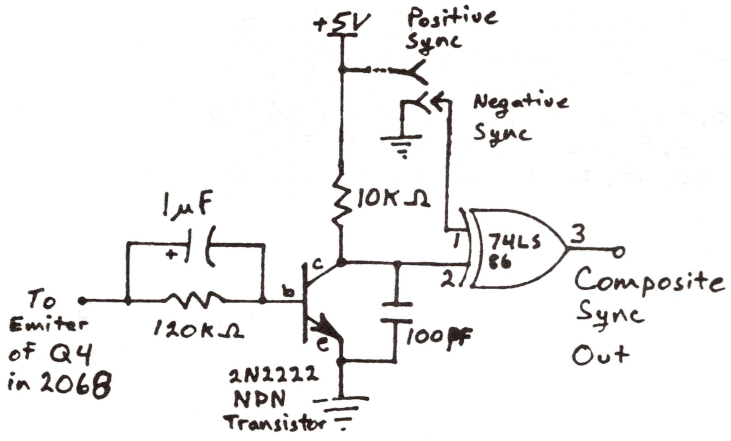
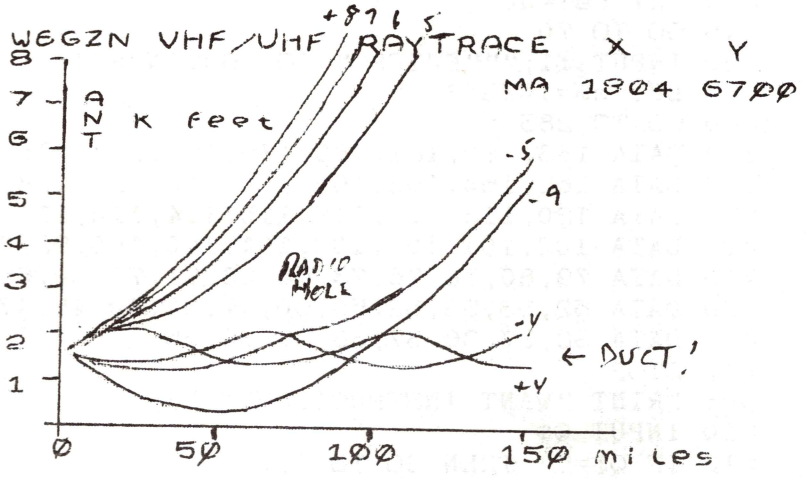


Better RGB Circuit







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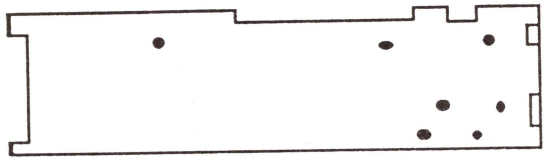
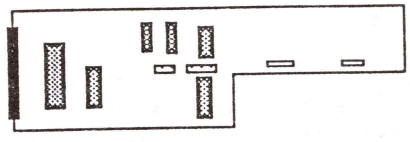
LOWER CASE
SCREWS WASHERS

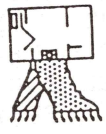
QL Circuit Diagram

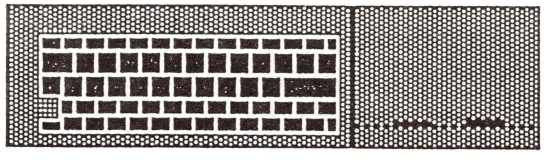
Manuals cables power pack

2 Microdrive Cartridges









A+ Computer Response 69-b Island St. Keene, NH 03431

Sinclair QL Technical Profile

System Configuration

Basic system for $299 (U.S. price only) includes two processors, two custom-designed control chips, 128K main memory (expandable), operating system, programming language, full-size 65-key QWERTY keyboard, twin QL Microdrives (100K-byte capacity each with 3.5 seconds average access time), four software programs on Microdrive cassette (word processing, spreadsheet, database management, graphics), four blank Microdrive cassettes, power supply, connecting cables and adapters for TV, monitor and LAN.

Hardware

RAM: 128K, expandable externally to 640K (32K dedicated for screen bit map).

ROM: 48K, contains Sinclair SuperBASIC and Sinclair Qdos operating system (expandable via ROM cartridge to 64K).

CPU: MOTOROLA 68008, running at 7.5MHz, for all principal functions. (Architecturally the 68008 is a 32-bit processor with an 8-bit data bus. One megabyte of non-segmented address space is available.)

INTEL 8049, a second processor, controls keyboard, sound, RS-232C receive and real-time clock functions.

Custom Chips: Four Sinclair-designed ICs. The first controls display and memory; the second controls the Microdrives, the real-time clock, local area network and RS-232C transmission; the third and fourth provide analog functions required by the Microdrives.

Video: High-resolution graphics capability with color/monochrome monitor (or TV) in two modes; 512 x 256 pixels (4-color), 256 x 256 pixels (8-color).

Normal character display format up to 85 x 25 with choice of character sets available; TV format up to 60 columns depending on software.

Power Supply: 120 volts at 60Hz, 9v DC at 1.8 amps, 15.6v AC at 0.2 amps from transformer unit (19 watts to computer).

Mechanical Specifications

Dimensions:	5⅜"	x	1¾"	x	18¾"
	138mm	x	46mm	x	472mm
Weight:	3.055 lbs. (1388 gms.)				

Software

Operating System: Qdos, developed by Sinclair. Key features include:
- single-user multiple tasking
- time sliced priority job scheduler
- display handling for multiple screen windows
- device-independent input-output

Language: Sinclair SuperBASIC. Key features include:
- procedure structuring
- extendability (including syntax)
- interpretation speed independent of program size
- clean machine code interface
- operating system facilities accessible from SuperBASIC
- equal capability for strings and arrays

Communications

Serial: Two standard RS-232C communications interfaces for printers, modems, etc. Transmission at rates from 75-19,200 baud or full-duplex transmit/receive at seven rates up to 9600 baud. (Note: a parallel printer interface is under development as an optional extra).

LAN: For up to 64 Sinclair QL computers; data transmission over the net at 100K baud

Expansion

Excluding RGB monitor and power sockets and the TV port, nine peripheral/expansion ports are provided; internal expansion (1 port), Microdrive expansion (1), ROM cartridge (1), serial (2), local area network (LAN) (2), joysticks (2). For serial and LAN, see Communications.

Memory: One megabyte of non-segmented address space is available for almost unlimited potential for expansion.

Microdrive: Enables a further six QL Microdrives to be attached. Four blank cartridges are supplied with each QL.

ROM Cartridge: Accepts one QL ROM cartridge up to 16K.

Joysticks: Provision for one or two for games or cursor control.

TRANSMISSION LINE IMPEDANCE

```
 100 REM TRANLINE
 105 BORDER 1: PAPER 5: INK 0: CLS
 110 REM Calc. characteristic   impedance of transmission line
 120 REM 73 Mag Sept '86
 130 REM Delete color and graphics for ZX81/TS1000
 135 REM ZX81/TS1000 need separate line inputs
 140 LET S=5
 150 LET Q=18
 170 PRINT TAB S;"* * * * * * * * * * *"
 180 PRINT TAB S;"*                   *"
 190 PRINT TAB S;"*   TRANSMISSION    *"
 200 PRINT TAB S;"*      LINE         *"
 210 PRINT TAB S;"*    IMPEDANCE      *"
 220 PRINT TAB S;"*                   *"
 230 PRINT TAB S;"*   BY J. J. CARR   *"
 240 PRINT TAB S;"* * * * * * * * * * *"
 242 PRINT : PRINT : PRINT TAB s;"Translated by WA6DLI"'TAB s;"From 73 Magazine
9/86"'TAB s;"K4IPV-Arlington, VA"
 245 PAUSE 200
 250 CLS : PRINT : PRINT : PRINT
 280 PRINT TAB s;"This program will compute  the characteristic impedance of Cab
le, Open-Wire Pair, Shielded Parallel,and Microstrip line."
 310 PAUSE 200: LET s=5: CLS
 320 PRINT TAB s;"SELECT FROM MENU BY NUMBER"
 330 PRINT
 340 PRINT "1. Center/Shield COAXIAL Cable"
 345 PRINT
 350 PRINT "2. Parallel Open-Wire Feeder"
 355 PRINT
 360 PRINT "3. Shielded Parallel Conductor"
 365 PRINT
 370 PRINT "4. Microstrip (PC) Parallel Line"
 380 PRINT
 385 PRINT "5. Quit?"
 390 INPUT "SELECTION? (1-5)";m
 395 CLS : GO TO m*400
 400 PRINT "COAXIAL CABLE SELECTED"
 410 PRINT
 420 PRINT "Diameters d AND D are to be in  SAME UNITS"
 425 CIRCLE 60,75,30: CIRCLE 60,75,27: CIRCLE 60,75,7: CIRCLE 60,75,2: PLOT 120,
105: DRAW 90,0: DRAW 0,-60: DRAW -90,0: DRAW 0,60: PLOT 210,102: DRAW 20,0: DRAW
 0,-54: DRAW -20,0: PLOT 230,82: DRAW 5,0: DRAW 0,-14: DRAW -5,0: PLOT 235,76: D
RAW 7,0: DRAW 0
 -4: DRAW -7,0
 426 PRINT AT 13,30;"^";AT 14,30;"d"
 427 PRINT AT 16,28;"^";AT 17,28;"D"
 430 INPUT "Diameter of inner conductor (d)";d1
 435 PRINT
 440 INPUT "Overall Shield Diameter (OD ok)";d2
 450 PAUSE 200:
 460 PRINT : PRINT   PRINT "SELECT DI-ELECTRIC INSULATOR:": PRINT
 470 PRINT "1. Foam Polyethylene"
 480 PRINT '"2  Regular Polyethylene"
 490 PRINT '"3. Teflon"
 500 PRINT '"4. Air-space Polyethylene"
 510 PRINT '"5. Air Insulated"
 520 INPUT "Selection (1-5)";S
 530 IF s=1 THEN LET v=.8
 540 IF s=2 THEN LET v=.66
 550 IF s=3 THEN LET v=.7
 560 IF s=4 THEN LET v=.85
```

```
570>IF s=5 THEN LET v=1
580 IF s<1 OR s>5 THEN GO TO 460
590 LET e=1/(v^2)
600 LET za=LN (d2/d1)
610 LET za=za*.4343
620 LET zb=138/(SQR (e))
630 LET zo=za*zb
640 PRINT '' FLASH 1;"Characteristic ZO= ";INT zo;" Ohms"; FLASH 0
650 PAUSE 200: INPUT "DO YOU WANT ANOTHER COAX CALCULATION? Y/N";A$: CLS
660 IF A$="Y" OR A$="y" THEN GO TO 400
670 GO TO 310
800 CLS :
810 PRINT "PARALLEL OPEN-WIRE FEED"
830 PRINT "All dimensions in same units!"
840 CIRCLE 180,100,2: CIRCLE 200,100,2: PLOT 70,110: DRAW 100,-80: PLOT 50,90:
DRAW 96,-75
850 INK 2: PLOT 80,107: DRAW -24,-24: PLOT 100,90: DRAW -24,-24: PLOT 118,73: D
RAW -24,-24: PLOT 139,56: DRAW -24,-24: PLOT 159,39: DRAW -24,-24: INK 0
860 PRINT AT 14,10;"^";AT 12,13;"^";AT 14,0;"Conductors";AT 18,14;"^";AT 19,5;
INK 2;"Spreaders"
870 PRINT AT 10,14;" Spacing ^";AT 9,26;"<Diam."
879 INPUT "Conductor Diam. (D)";d;"Spacing?(S)";s
880 LET za=(2*s)/d
890 LET za=LN (za)
900 LET za=za*.4343
910 LET zo=za*276
920 PRINT FLASH 1;"Characteristic ZO= ";INT zo;" Ohms"; FLASH 0
930 PAUSE 200: INPUT "Another Open-Wire?Y/N?";a$
940 IF a$="y" OR a$="Y" THEN GO TO 800
950 CLS : GO TO 310
1200 CLS : PRINT "SHIELDED PARALLEL CONDUCTOR"'
1210 PRINT "All dimensions in SAME Units"
1220 CIRCLE 120,79,65: CIRCLE 120,79,63: CIRCLE 90,79,12: CIRCLE 147,79,12
1230 PRINT AT 14,11;"^Spacing^"
1240 PRINT AT 9,10;"\Cond. Diam."
1250 PRINT AT 4,19;"/Shield Diam."
1260 INPUT "Spacing?";h;"Cond.Diam";d1;"Shield Diam.";d2
1270 LET b=h/d2: LET a=h/d1
1280 LET c=2*a*((1-b^2)/(1+b^2))
1290 LET f=LN c
1300 LET f=f*.4343
1310 LET v=.8
1320 LET e=1/SQR v
1330 LET zo=(276*f)/(SQR e)
1340 PRINT FLASH 1;"Characteristic ZO= ";INT zo;" Ohms"; FLASH 0
1350 INPUT "Another Twin Shield?";a$
1360 IF A$="y" OR a$="Y" THEN GO TO 1200
1370 GO TO 310
1600 CLS : PRINT "PRINTED CIRCUIT MICROSTRIP"'
1610 PRINT "All dimensions SAME units"
1620 PLOT 45,99: DRAW 100,45: DRAW 90.-70: DRAW -90,-40: DRAW -99,64: DRAW 0,-10
: DRAW 100,-65: DRAW 0,10: DRAW 90,40: DRAW 0,-10: DRAW -90,-40
1630 INK 2: PLOT 80,65: DRAW 108,45: PLOT 99,52: DRAW 108,44: PLOT 99,52: DRAW -
15,12: INK 0
1640 PRINT AT 12,0;"Thickness^";AT 13,0;"PC Board"
1650 PRINT AT 15,0;"Copper"'"Microstrip /"
1660 PRINT AT 5,21;"< Grn Plane";AT 6,22;"Cu Foil"
1670 INPUT "PC Thickness";t;"Strip Width";w
1680 INPUT "Select Board Type:1. Glass Epoxy 2. Teflon-Glass";g
1690 IF g=1 THEN LET e=4.8: GO TO 1710
1700 LET e=2.5
```

```
1710>LET za=w*(SQR e)
1720 LET zb=t/za
1730 LET zo=377*zb
1740 LET k=(w/t)^-.836
1750 LET l=1.735*(e^-.724)
1760 LET j=l*l
1770 LET y=1+j
1780 LET zo=zo/y
1790 PRINT AT 2,2; FLASH 1;"Characteristic ZO= ";INT zo;" Ohms"; FLASH 0
1800 PAUSE 200: INPUT "Another StripLine?";a$
1810 IF A$="y" OR a$="Y" THEN GO TO 1600
1820 GO TO 310
2000 CLS : PRINT AT 10,10;"Goodbye!"
```

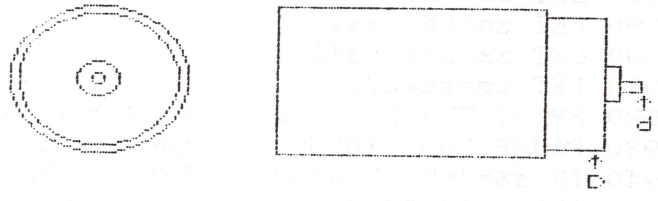
SELECT FROM MENU BY NUMBER

1. Center/Shield COAXIAL Cable
2. Parallel Open-Wire Feeder
3. Shielded Parallel Conductor
4. Microstrip (PC) Parallel Line
5. Quit?

SELECTION? (1-5)L

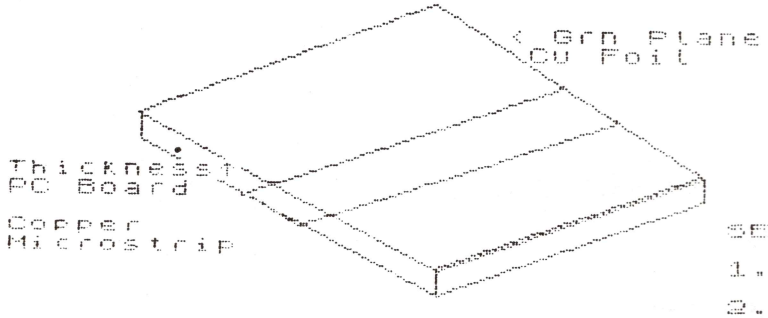
COAXIAL CABLE SELECTED

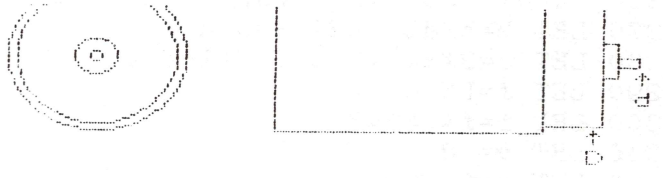
Diameters d AND D are to be in SAME UNITS



Diameter of inner conductor (d)L

4. PRINTED CIRCUIT MICROSTRIP
All dimensions SAME units





PC Thickness?

SELECT DI-ELECTRIC INSULATOR:

1. Foam Polyethylene
2. Regular Polyethylene
3. Teflon
4. Air-space Polyethylene
5. Air Insulated

Selection (1-5)L

Characteristic ZO= 85 Ohms

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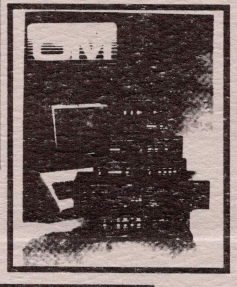

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